THE STEEL INDUSTRY IN TRANSITION

Staff Working Paper

The Congress of the United States
Congressional Budget Office

March 18, 1982

J932-11

INTRODUCTION

The domestic steel industry is in a period of transition. The centralized, fully integrated industry is changing to one that is more decentralized, diversified, and competitive. This transition has already been marked by a decline of the large, integrated producers in terms of market share, profitability, and employment. Their place in the market has been taken by smaller, nonintegrated domestic steelmakers and by imports.

The purpose of this paper is to present a general overview of these events and to describe the prospects of the industry over the coming decade. This paper summarizes background research undertaken for the Subcommittee on Oversight and Investigations of the House Energy and Commerce Committee. Its contents include:

- A description of the recent performance of the integrated steel producers;
- An examination of the factors affecting that performance;
- A summary of the current federal role in the steel industry; and
- Projections regarding the performance of the steel industry over the coming decade if current federal policies and industry conditions remain unchanged.

The domestic steel industry includes seven corporations with annual sales in excess of $1.5 billion, and another 30 or so smaller firms. All of the large firms and several of the small firms are known as integrated producers--they are involved in all steps of the steel production process from iron ore and coal to steel plates, coils, bars, or tubes. The rest of the firms, the nonintegrated steelmakers, typically do not refine steel from iron. Rather, their source of raw material is scrap steel, which they melt and reprocess. Some small firms use modern highly productive technologies to fabricate steel into basic products for regional markets. Other firms manufacture specialty steels such as stainless steel, grain-oriented steel, tool steel, and special alloys.

This paper focuses on the large, integrated producers of carbon steel--U.S. Steel, Bethlehem, National, Armco, Inland, LTV, and Republic--because the future of the integrated steel industry is the subject of most of the current policy debate, and is the sector with the most problems. If current federal policies and industry conditions continue, the 1980s are

likely to witness a steady, though not dramatic, erosion of the market share, profits, and labor force of the integrated steel firms, which in 1981 provided 72 percent of the nation's supply of steel. By contrast, importers and nonintegrated domestic steelmakers are likely to increase their market share during this transition. Accordingly, increases in employment and investment by nonintegrated producers will, to a degree, compensate for the decline of the integrated sector.

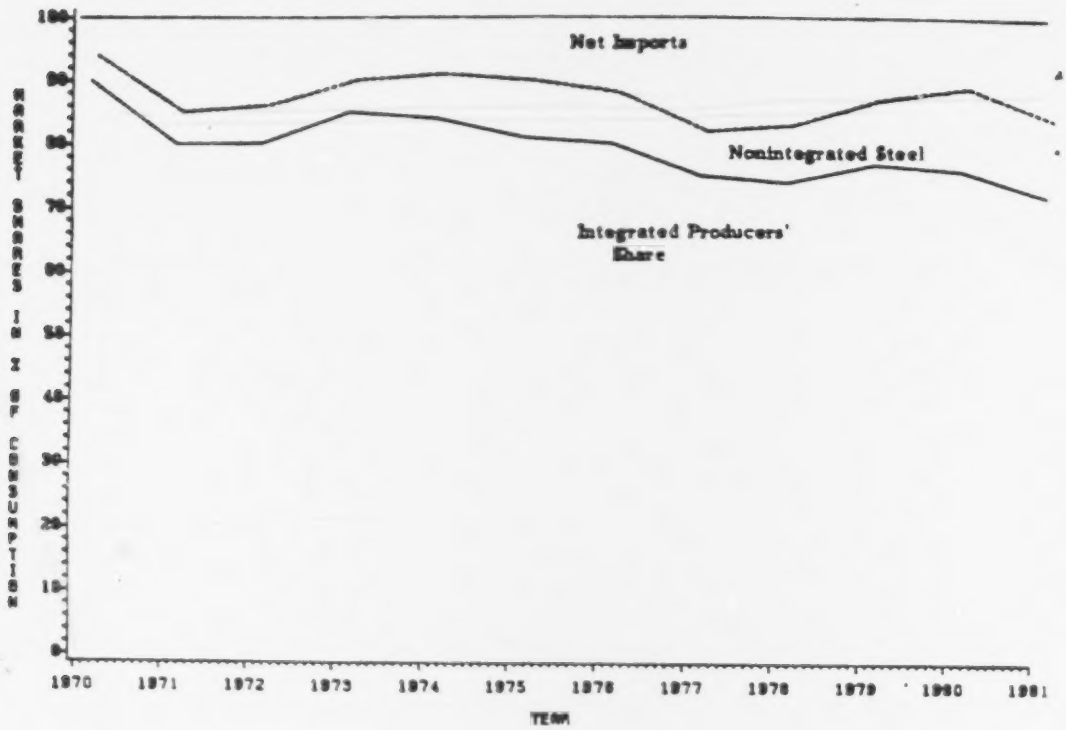
THE DECLINE OF THE INTEGRATED STEEL PRODUCERS

The domestic integrated iron and steel industry is slowly but steadily contracting. Total demand for steel products in the United States did not increase during the 1970s, and domestic integrated producers lost markets to domestic nonintegrated producers and to imports. The integrated producers held roughly 83 percent of the domestic market from 1970 through 1975, but their share fell to about 72 percent by 1981, as shown in Figure 1. To some extent, the decline of the integrated producers has been counterbalanced by the growth of the nonintegrated firms. Shipments from nonintegrated producers tripled during the 1970s, and attained a market share in 1981 of 12 percent. 1/ The nonintegrated producers cannot, however, by the nature of their technology, expand into a majority of the markets and product lines. About two-thirds of all steel consumed are flat-rolled products requiring large rolling mills. It would not be economic for small nonintegrated firms to enter such markets.

More important than the shift of market share has been the effect of intense price competition from abroad. Excess capacity in international markets has led to low profit margins for virtually all products and all producers--integrated and nonintegrated alike. U.S. integrated producers' combined annual real income after taxes, from 1975 through 1980, has been about 50 percent of what it was during the decade of 1965 to 1975.

The steel industry is highly cyclical, and this characteristic, shown in Figure 2, often masks long-term trends until they are far advanced. The industry depends on substantial profits in good years to compensate for low profits during off years of the business cycle. In the most recent upswing, however, profits did not recover, and some firms in the industry may be financially unable to survive the lean years ahead. Its cyclical nature also injects an element of risk into the steel industry that reduces its overall attractiveness to the investment community. The stock market has not been slow to notice this risk, and the decline in profitability; so a typical share of steel company stock today sells for less than 40 percent of its book value.

FIGURE 1. MARKET SHARES OF IMPORTS, INTEGRATED AND NONINTEGRATED FIRMS



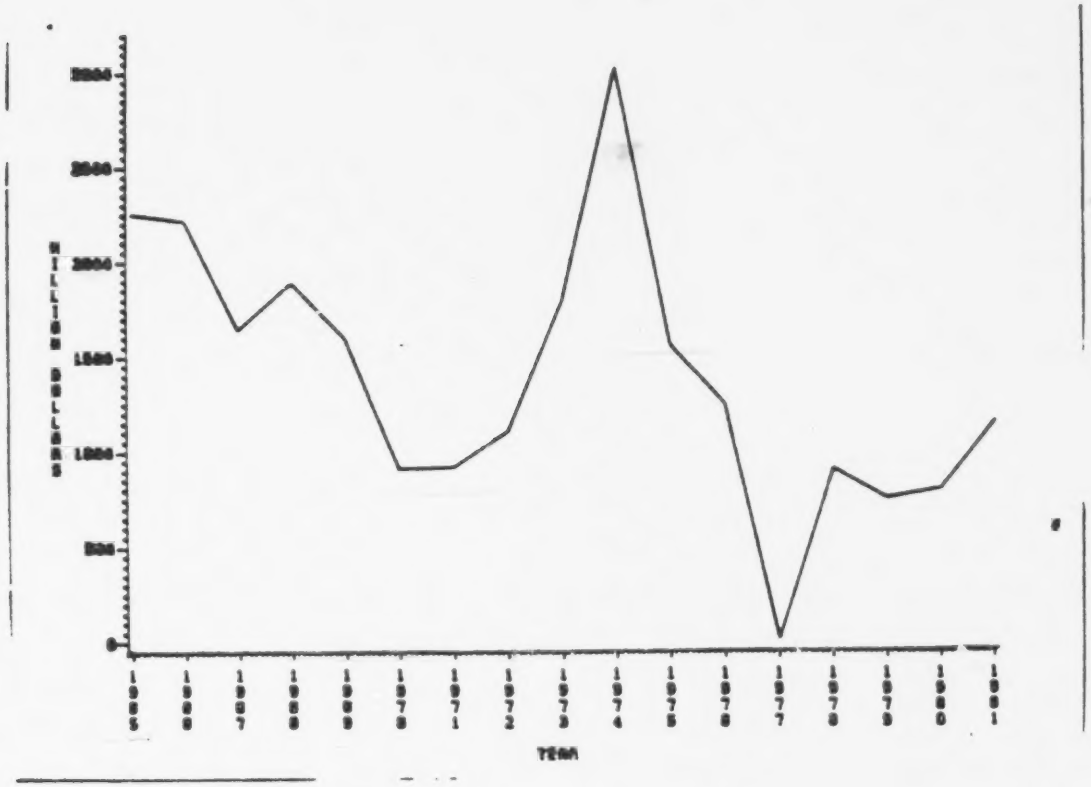
SOURCES: American Iron and Steel Institute, Annual Statistical Report (1980).

Joseph Wyman, Steel Mini-Mills (Shearson Loeb Rhodes, Inc., 1980).

CBO estimates.

BEST COPY AVAILABLE

FIGURE 2. REAL NET INCOME FROM INTEGRATED STEEL PRODUCTION
(In millions of 1980 dollars)



SOURCES: American Iron and Steel Institute, Annual Statistical Report (1980).

Annual reports of individual companies.

"Steel Profits Rebound in 1981," Iron Age (February 19, 1982).

BEST COPY AVAILABLE

This financial decline has been accompanied by a low rate of investment in basic steelmaking. If a firm loses profitability, it also loses the ability to generate funds to invest, and thereby finds it more difficult to be profitable in the future. Domestic steel producers have fallen into this downward spiral. Figure 3 illustrates how the integrated steel industry has fallen short of other industries, such as paper and wood products, in generating internal "cash flow" for investment. As a percentage of sales, cash flow for the steel industry has averaged 7.7 percent since 1970, compared with 9.3 percent for all industry. 2/ The industry can also generate investment funds externally by selling stock, or acquiring more debt. But the steel industry has not been aggressive in pursuing external financing, in part because prospective investors recognize the poor cash flow and profitability, and place a high risk premium on steel company investments. Since 1970, aggregate return on invested capital has averaged 6.8 percent for steel firms compared with 14.6 percent for all domestic manufacturing industries. When income from non-steel subsidiaries is excluded, return on invested capital in steel is between 3 and 6 percent, compared with a cost of capital of 15 to 18 percent. 3/ Until recent years, the industry was also reluctant to sell assets (such as coal reserves) or to use capital generated by non-steel operations to provide investment capital.

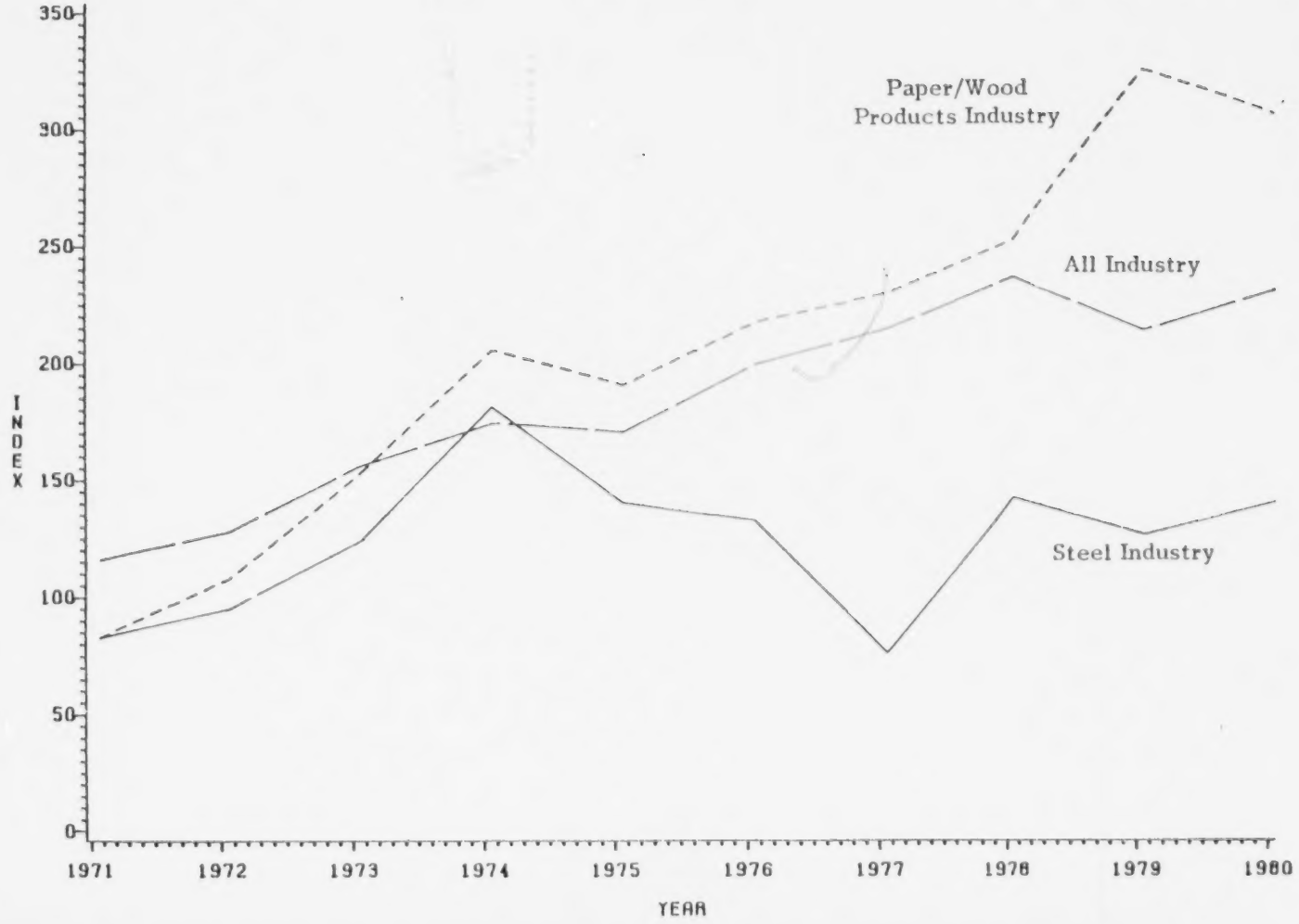
Just to maintain facilities—or to replace them as they physically depreciate on a 25-year cycle--requires capital expenditures in steelmaking of between $4 billion and $5 billion per year, by the industry's estimate. 4/ Because of poor prospective returns from investment the integrated industry has not attained this level of investment since 1970.

The decline of the integrated steel industry has led to reduced employment. In the decade before 1974, employment in the industry varied between 500,000 and 550,000. But since 1974 it has fallen to about 391,000, a drop of about 3.8 percent per year since 1974. The decline in employment has resulted as much from increases in productivity as from lack of growth. By contrast, employment by nonintegrated producers has increased to about 30,000 due to expansion of capacity, as shown in Figure 4.

CAUSES OF THE DECLINE

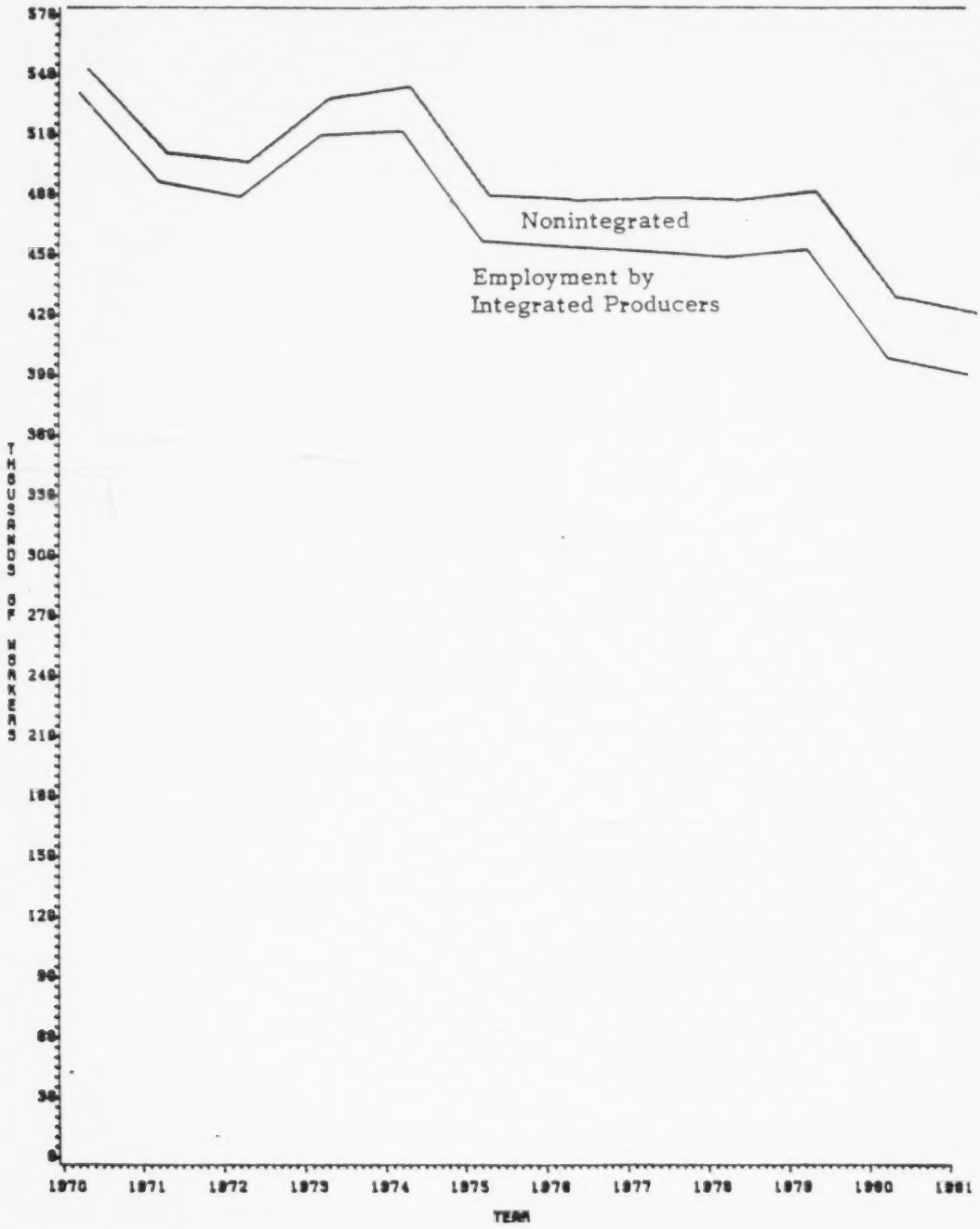
The decline of the integrated producers during the past decade has its roots in several factors. First, the demand for steel has been stagnant, not only in the United States but in the rest of the non-Communist world as well, accompanied by significant overcapacity worldwide. Second, competition from foreign producers and nonintegrated domestic firms has depressed prices and eroded the market share and profitability of the integrated steel companies. Third, the rate of change of labor costs has exceeded produc-

FIGURE 3. COMPARISON OF CASH FLOW



SOURCES: Steel-Coal, Basic Analysis (Standard and Poor's Industry Surveys, October 30, 1980).

FIGURE 4. EMPLOYMENT IN THE STEEL INDUSTRY



SOURCES: American Iron and Steel Institute, Annual Statistical Report (1980).

Annual reports of individual companies.

CBO estimates.

tivity gains, thus reducing the ability of the integrated firms to compete on the basis of price. And finally, other factors including management, lack of innovation, environmental regulations, and tax policy have also figured in the situation of the integrated steelmakers. In what follows, each of these factors is addressed separately.

The Demand for Steel

The United States is affected by the world steel market because supply and demand conditions in foreign countries exert a strong influence on domestic prices. World demand since 1974 has been stagnant because of slow economic activity, price increases, and the substitution of other products for steel. Steel use in developed nations has declined relative to real GNP by about 21 percent between 1970 and 1981. Most producers did not foresee this decline and continued to expand capacity during the period. As a result, the free world's aggregate capacity utilization rate (operating rate) has not exceeded 75 percent since 1974. Because many producers cannot operate profitably at such low rates, competition has been intense, and most producers have been cutting prices in order to increase their sales.

Competition in Steel Production

The salient condition affecting world steel markets is overcapacity. In 1981, raw steel production capacity in the free world was 665 million tons, but only 455 million tons were produced. 5/ Because of this, many foreign producers sell steel in the United States at prices below their average cost. At the same time the nonintegrated domestic producers, with their inherent cost advantages, compete more successfully in regional U.S. markets. The result is lower profitability and reduced market share for the domestic integrated steelmakers.

Foreign Competition. In recent years, the steel-producing nations that compete with the United States have evolved into three groups: high-technology, high-cost producers, including most European nations; low-technology, low-cost producers, including most developing nations; and high-technology low-cost producers, primarily Japan and Canada. Each of these groups has unique advantages and disadvantages in the American market. Table 1 shows the principal steel-producing nations and their exports to the United States.

The overcapacity problem is most acute in Europe because European demand is depressed, and steelmakers there have lost many traditional export markets in developing countries to new producers in those nations.

TABLE 1. MAJOR COMPETITOR NATIONS: STEEL CAPACITY, PRODUCTION, AND EXPORTS TO THE UNITED STATES

	1981 Steel Shipment Capacity (millions of tons per year)	1981 Shipments (million of tons per year)	1981 Exports to U.S. (thousands of tons)	Percent of Production Exported to U.S.
United States	115	84	---	---
High-Technology, High-Cost Producers				
West Germany	56	37	2,165	7
France	26	19	1,290	8
Belgium-Luxembourg	23	15	1,110	9
Italy	29	20	768	6
United Kingdom	24	17	575	4
High-Technology, Low-Cost Producers				
Japan	124	79	6,220	8
Canada	15	12	2,900	25
Low-Technology, Low-Cost Producers				
South Korea	7	6	1,220	24
Spain	12	10	730	8
Brazil	12	11	550	6
South Africa	8	7	370	7

SOURCES: AISI, Annual Statistical Report (1980), and Imports of Iron and Steel Products (1981).

Charles Bradford in Steel Industry Quarterly (Merrill Lynch, February 1980), p. 32.

International Iron and Steel Institute, Map of World Steel Production and Consumption (1981).

NOTE: For clarity, the statistics for capacity and production are measured on the basis of tonnage shipped from mills, not on the more common basis of raw steel produced.

As a result, the United States has become the Europeans' largest export market.

Most European steelmakers have been unprofitable in every year since 1974, primarily because of overcapacity. They have poor access to markets and raw materials, as well as high labor costs and low productivity. Much evidence suggests that the price of European steel landed at United States ports has been below the average cost of European producers. In many cases, it appears that the European producers have cut prices of exports below their production costs in order to sell their products and maintain employment in their mills.

Subsidies in various forms have become increasingly important in the last eight to ten years, and tend to preserve the ability of European steelmakers to sell exports below cost. These subsidies are a continual element of public and political debate in Europe. 6/ Since 1976, European countries have spent the equivalent of about $14 billion in steel subsidies—or $46 per ton produced. 7/ For example, in February 1982, the European Economic Community approved a coordinated subsidy program by its member governments worth an additional $1.4 billion during 1982. 8/

High-technology, low-cost producers such as Japan and Canada find that they too must operate at low rates because of the depressed market. Except for high-value specialty products such as seamless pipes, they too are losing profits to producers selling below production cost. Low-cost, low-technology producers have less flexibility in adjusting product lines to meet markets, so they are also affected by the price cutting. Although their production costs are low, both Brazil and Spain have had suits brought against them by U.S. steelmakers charging that they have sold below cost in order to meet competition.

International Cost Comparisons. It will be helpful to make some broad comparisons of production costs in order to determine whether the U.S. industry can expect in the long run to compete profitably with imports. In this paper, production costs are defined as the weighted average costs for all carbon steel produced within a nation.

International cost comparisons must be used with caution. Considerable ambiguity surrounds the cost data for foreign producers, and fluctuations in exchange rates and operating rates can shift apparent costs markedly. Nevertheless, some general conclusions can still be drawn. First, the historic advantage of the United States in raw materials costs no longer exists. As Table 2 suggests, material costs for U.S. steelmakers are somewhat higher than those in West Germany and Japan, due primarily to German and Japanese exploitation of new ore reserves and to lower shipping

TABLE 2. COST COMPONENTS FOR WEST GERMANY, JAPAN, AND THE UNITED STATES IN 1981, ACCORDING TO SEVERAL SOURCES

	West Germany (dollars per ton)			Japan (dollars per ton)			USA (dollars per ton)
	a/	b/	d/	a/	c/	d/	d/
Production Costs							
Materials			274		252	294	326
Labor			143		107	111	184
Financial			56		109	104	43
Total		521	473		468	509	553
Transportation Costs	71		71	81	110	81	--
Total Cost			544		578	590	553
Operation Rate (percent)		62			58		75
Exchange Rate (per dollar)		2.29			222		--

NOTE: Estimates have been adjusted in order to be comparable.

SOURCES:

a/ Council on Wage and Price Stability, Prices and Costs in the United States Steel Industry (October 1977), p. 74.

b/ U.S. Steel, Petition for Relief: West Germany (1981).

c/ Department of Commerce, reported by Charles Bradford in Steel Industry Quarterly (Merrill Lynch, February 1982), pp. 36-37.

d/ Peter Marcus, World Steel Dynamics: Core Q (Paine, Webber, Mitchell, and Hutchins, Inc., September 1981).

costs. Second, foreign producers have lower labor costs than domestic steelmakers. Although labor input per ton produced in West Germany and Japan is similar to that in the United States, the wage rates for steelworkers are lower in those countries. Third, U.S. steelmakers remain competitive in domestic markets because of lower financing costs and because they pay no transportation charges to reach the United States. The low finance costs are due to relatively low debt levels of domestic producers, and to low levels of capital investment.

Relative advantages in production costs fluctuate markedly with operating rates and exchange rates. With regard to operating rates, the United States' apparent cost advantage over Japan in 1981 was due in large part to much higher operating rates in this country during the first three quarters of the year. This advantage disappeared entirely during the last quarter when both nations' steel producers operated at similar rates. Table 3 illustrates U.S. landed production costs for several countries at different operating rates. The table shows that a relatively higher operating rate is one reason for the favorable U.S. cost position in 1981. If business conditions change so that U.S. producers' operating rate is similar to that of Japan or West Germany, this advantage could erode.

Exchange rate fluctuations can also alter apparent relative costs very quickly. For example, the West German cost advantage in 1981 was primarily a result of the depreciation of the mark by 26 percent against the dollar. Apparent German production costs changed from a relative disadvantage of $64 per ton in 1980 to an advantage of $9 per ton in 1981. These factors illustrate the volatility of relative cost advantages, and also suggest that domestic steel could be quite capable of competing with imports if the imports were priced at their apparent average production cost plus transportation. However, there is some evidence to suggest that they are not.

Many analysts have argued that some, but not all, foreign steelmakers sell in U.S. markets at prices lower than average production costs. For example, Figure 5, drawn from data by Peter Marcus of Paine Webber and by a Petition for Relief filed by U.S. Steel, compares aggregate production costs per ton for French and German producers with the revenues realized for their exports to the United States. (The Germans have typically been the most efficient of the European producers, while the French have been about average.) These data indicate that the average cost of producing a ton of steel in West Germany and France substantially exceeds the revenue received for the steel in United States markets. One result of this price competition has been to keep U.S. steel prices low enough to discourage investment in new capacity.

TABLE 3. LANDED PRODUCTION COSTS OF SELECTED COUNTRIES AT DIFFERENT OPERATING RATES IN 1981 (In dollars per ton)

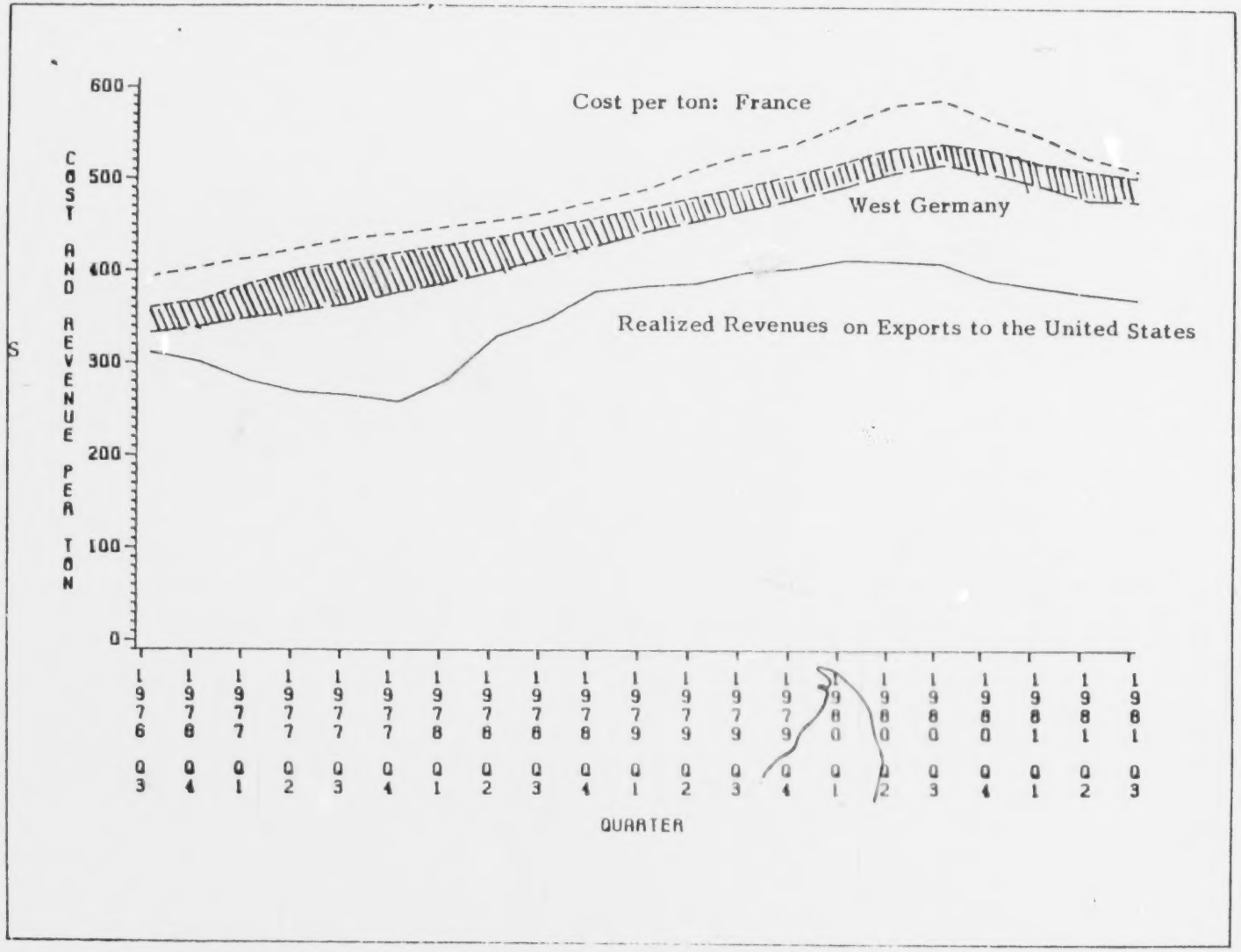
	USA	Japan	West Germany	France	Great Britain
Operating at 70 Percent of Capacity	562	569	534	585	689
Actual Conditions (Operating Rate)	553 (75.0)	590 (58.0)	544 (62.1)	581 (74.6)	706 (61.3)
Operating at 90 Percent of Capacity	534	508	489	545	621

SOURCES: Council on Wage and Price Stability, Prices and Costs in the United States Steel Industry (October 1977), p. 74.

Peter Marcus, The Steel Strategist #4 (Paine, Webber, Mitchell, and Hutchins, Inc., September, 1981).

NOTE: Production costs include freight charges and duties to the port of entry into the United States.

FIGURE 5. COMPOSITE PRODUCTION COSTS AND REALIZED REVENUES PER TON FROM EXPORTS



NOTE: Production costs for France and a range of costs for West Germany are shown. Realized revenues per ton are the same for both nations.

SOURCES: U.S. Steel, Petition for Relief: West Germany (1981).

Peter Marcus, World Steel Dynamics: Core Q and Core S (Paine, Webber, Mitchell, and Hutchins, Inc., September 1981).

Nevertheless, the U.S. steel industry has generally shown a profit, with the exception of net losses in 1977 and 1980, while the European industry has consistently shcwn operating losses (see Table 4). Foreign producers that export below their production costs apparently do so in order to maintain employment and perhaps also to maintain capacity in the event that demand for steel rises in the future. With this as their goal rather than profits, and with government subsidies to sustain them, European steelmakers appear capable of stiff price competition with the U. S. industry for the foreseeable future.

Domestic Competitors. Imports have not been the only source of competition; in addition, many smaller, nonintegrated domestic steelmakers have prospered at the expense of the integrated firms.

The conventional approach to making steel through an integrated process has been avoided by a number of companies that buy scrap iron and remelt it in electric furnaces to make steel. While the integrated process is highly energy-intensive and reflects the costs of iron ore and coking coal, the nonintegrated process uses much less energy and reflects mostly the cost of scrap. During most of the 1970s, the costs of integrated processes have exceeded those based on scrap steel. The integrated producers expected that scrap prices would increase faster than the equivalent costs of iron ore and coal, but this did not happen. As a result, the nonintegrated producers have thrived and have tripled their production levels since 1970. 9/

The nonintegrated mills have seized the opportunity provided by low-cost raw materials. They have built new facilities in regions where (1) scrap was available, (2) demand for basic products (such as construction materials) was growing, (3) no integrated mills existed, and (4) electricity and labor rates were low. Most of these facilities used nonunion construction and operating personnel and installed highly efficient but flexible processes to produce steel for growing regional markets—particularly those in the South and Southwest. Several of the integrated producers have recognized these advantages and have converted some mills into electric furnace operations. Nonintegrated mills succeeded in capturing markets for certain products from both integrated mills and imports. Table 5 shows how nonintegrated producers have penetrated certain markets--such as wires and bars--and it also shows that the nonintegrated firms cannot compete in markets for about 65 percent of domestic steel products.

The advantages of the nonintegrated firms are low labor and material costs. Some new nonintegrated mills require only 1.5 to 2.5 man-hours per ton shipped. The average for nonintegrated firms is between 4 and 6 man-hours per ton, compared to 8 to 9 man-hours for the average integrated firm

TABLE 4. OPERATING PROFITS AND LOSSES IN DOLLARS PER TON

	United States	Japan	West Germany	France	Great Britain
1981	15	---	(43)	(50)	(75)
1980	(18)	24	(13)	(79)	(218)
1979	35	47	10	(48)	(48)
1978	30	10	(16)	(42)	(67)
1977	(6)	(15)	(46)	(83)	(52)
1976	3	(17)	(18)	(56)	(34)
1975	7	(10)	(26)	(69)	(68)
1974	26	18	39	1	(1)
Average Profit (or Loss) per ton 1/	16	10	(9)	(53)	(59)

SOURCE: Annual reports and preliminary quarterly reports of major operating companies.

Peter Marcus, World Steel Dynamics, Core Q (Paine, Webber, Mitchell, and Hutchins, Inc., September 1981).

1/ Average price per ton was about $300.

TABLE 5. DOMESTIC PRODUCERS' SHIPMENTS COMPARED WITH MARKET SHARE OF NONINTEGRATED FIRMS

	Total Shipments by Domestic Producers (millions of tons)	Actual Market Share of Nonintegrated Firms (percent of specific product)	Potential Market Share of Nonintegrated Firms (percent of specific product)
Flat Rolled Products			
Sheets	33.6	0	0
Coated Products/ Tin Plate	5.7	0	0
Large Structural Shapes and Rails	5.2	5	10
Plates	8.1	5-10	25
Semi-Finished Products	5.3	5	10
Pipe and Tubing	9.1	5	25
Other			
Bars and Small Shapes	13.3	50	85
Wire	1.8	30	100

SOURCE: American Iron and Steel Institute, Annual Statistical Report (1980).

Office of Technology Assessment, U.S. Congress Technology and Steel Industry Competitiveness (June 1980), p. 257.

Personal Conversation with Joseph Wyman, Shearson American Express, February 17, 1982.

in 1981. 10/ At an average labor cost per hour in 1981 of $20.50, the advantage in labor costs for the nonintegrated firm is $60 to $80 per ton. Similarly, the material costs of making steel have averaged $10 to $15 per ton lower for scrap-based processes than for integrated processes. Although the nonintegrated firms have slightly higher financial costs per ton, and produce lower-priced products than the integrated producers, their profits per ton have usually exceeded those of the integrated firms. Since 1974 pretax profit margins of nonintegrated firms averaged 10.0 percent, compared with 3.2 percent for integrated firms. Return on equity has averaged 14.9 percent, compared with 5.9 percent for integrated firms. 11/ As a result, the nonintegrated firms have grown while the integrated firms have contracted.

Labor Costs

In addition to price competition, labor costs have been a primary contributor to the decline of the integrated steelmakers. Labor productivity growth since 1966 was not only slower in basic steel than in any other industry in the United States (except other primary metals), but steel wages also rose faster than any other. 12/ Wage rates in the domestic steel industry have grown so fast in the last decade that compensation for steelworkers in 1980 averaged 176 percent of the average manufacturing wage. Although this can be explained in part by the workers' skill and experience, as well as by hazardous working conditions, the wage differential has become a major cost disadvantage to domestic producers.

Labor costs in the United States in 1981 are estimated to be about $184 per ton shipped, compared to estimates of $143 per ton in West Germany and $111 per ton in Japan. 13/ Domestic nonintegrated producers were able to produce steel products at labor costs of $100 to $130 per ton. Direct comparisons are difficult, however, because some producers rely on contract workers for some of the tasks included in the production process.

If the U. S. industry had continued the productivity gains it attained during the growth period of 1950 to 1970, the high wage rates would not have become a competitive factor. But productivity increases after 1970 slowed considerably. This was primarily because world capacity exceeded demand, and new investment slowed. For example, from 1950 to 1970 the amount of capital stock available per U.S. worker grew at an average of 5.0 percent per year. As a result, tons produced per worker increased by 2.8 percent per year. Since 1970, productive capital has increased by only 0.4 percent per year, tonnage per worker by only 1.0 percent per year. 14/

Management

The industry has also been criticized for management inflexibility--or a reluctance to adjust to changing circumstances. There is no objective way to evaluate the management of an industry, and it is not the intent of this paper to make such an evaluation. However, many of the decisions made by managements of integrated firms have not turned out well either because of sheer bad luck or other reasons. For example, it appears that most integrated firms did not:

- foresee that demand would not grow, and take appropriate action to reduce capacity;
- aggressively pursue cost-saving innovations or develop new product lines;
- realize that scrap would become so plentiful that nonintegrated operations would be less costly than integrated ones;
- control the rapidly rising labor costs;
- use their assets or leverage to increase cash available for investment; or
- anticipate that other nations would subsidize their producers rather than cut capacity.

Decisions on these matters involved high risks. If the integrated steelmakers had been more aggressive, they might be in a better position today. On the other hand, in an industry that is not growing, and with firms that are in a precarious financial situation, a wrong decision can jeopardize a company's whole future. For this reason, management spokesmen believe that they have been prudent, rather than overly conservative.

Innovation

The U.S. steel industry has been innovative in some cases, but slow to adopt new technology in others. For example, several studies have addressed the conversion to basic oxygen furnaces during the 1960s. They conclude that domestic integrated producers were reluctant to introduce oxygen furnaces; however, after the furnaces became a proven and advantageous technology, no major producing country converted its existing plant to an optimal mix of basic oxygen furnaces more rapidly than the United States. 15/

By contrast, the acceptance of another, more recent, innovation--continuous casters--has been quite slow. Continuous casters are able to provide substantial savings of manpower and energy, and reduce the amount of waste steel. Continuous casting also provides a higher quality product. Several countries—Japan, West Germany, and Italy—have installed casters much faster than the United States, and most nonintegrated mills now use continuous casters. Because these casters provide unusually high returns on investment, the reluctance of the domestic integrated firms to invest is difficult to explain. The industry cites the constrained financial situation in the late 1970s and its pessimistic view of the future. Since late 1980, however, construction of 13 new large casters has been announced. These will double U.S. casting capacity in about three years.

On balance, it seems that most integrated firms were not as aggressive in adopting continuous casters as they were with basic oxygen furnaces. This reluctance has added to domestic integrated firms' competitive disadvantage.

Environmental Regulations

The domestic industry has spent about 18 percent of recent capital investment on pollution control—more per unit of sales than any other major industry. 16/ However, competitor nations have also invested in pollution control and some evidence suggests that their investment per ton of output may have exceeded that in this country. Estimated expenditures for European environmental requirements are incomplete, but the control strategies in some countries are similar in effect to those of the United States. In Japan, for example, pollution control expenditures have been at least as great as in the United States. In general, environmental regulations appear to have added about 4 to 5 percent ($15 to $20 per ton) to the world price of steel. 17/

Taxes

Before 1981, the industry claimed that domestic tax rates discouraged long-term investment because the depreciation rates were too slow relative to other industries and other nations. 18/ Until the passage of the Economic Recovery Tax Act of 1981 (ERTA), the United States permitted 55 to 60 percent of investment to be recovered in three years. In contrast, Canada, France, Italy, and Great Britain permitted 75 to 109 percent recovery in three years. 19/ Furthermore, several nations, including West Germany, Belgium, France, and Italy, have encouraged exports by rebating taxes on them. This rebate averages 11 to 20 percent of total tax liabilities

in these countries. 20/ Supportive tax treatment is held by many to be a principal cause of the thriving Canadian steel industry. Canadian aggregate corporate steel taxes as a percentage of profits averaged 6.75 percentage points less than U. S. taxes during the mid-1970s. 21/ However, international comparisons of tax treatment are necessarily imprecise because the basic tax structures differ markedly.

The Economic Recovery Tax Act of 1981 changes the domestic situation fundamentally. It shortens depreciation periods and eliminates the linkage between profitability and taxes by allowing certain tax benefits to be sold. This will be an increasingly important benefit to the industry in the future. By the mid-1980s, ERTA may increase cash available for investment by steel firms by $400 to $550 million per year, equivalent to an increase in cash flow of 12 to 17 percent per year. 22/ Whether these funds will be invested in steel operations, however, is open to question.

CURRENT FEDERAL ROLE

The federal role has three components: trade policy, regulations for health/environmental purposes, and social programs designed to deal with problems of transition and adjustment due to unemployment.

Trade Policy. World overcapacity in steel production was a concern by the end of the 1960s. In 1968, the United States negotiated several voluntary limitations with importers (called Voluntary Restraint Agreements) to avoid what was then viewed as a temporary dislocation in markets due to overcapacity and exchange rates. These agreements lasted until 1974, but were not effective after 1972 because of high world demand. In 1974, the Trade Act was passed. It defined dumping as selling below average production cost (and also used the traditional definition of selling exports below the home market price). When the world supply of steel exceeded demand again in 1977-1978, U.S. imports surged to 18 percent of the domestic market. Domestic producers brought suit under the Trade Act of 1974, asserting that certain imports were being sold below production costs. These suits were withdrawn after the creation of the Trigger Price Mechanism (TPM) in 1978. The trigger price, based on Japanese production costs, was intended to be an indicator of the lowest price that would not constitute dumping, or selling below average production cost. The TPM would be a lower bound for price competition and would limit unit losses due to price cutting. The 1978 TPM had no "surge" provision, or constraint on the quantity imported.

The TPM was modestly effective in providing a price floor as long as demand was high, but when demand declined in 1980, and again in 1981,

importers found that they lost markets. As a result, prices for imported steel--and to a lesser extent, domestic steel--drifted below the trigger price. Because the TPM is easily circumvented, it became ineffective and was abandoned.

Domestic producers brought suit in 1981 under the Tariff Act of 1930. They have sought administrative relief through countervailing duties and anti-dumping duties to compensate for foreign subsidies and sales below production costs. These suits are being processed by the Department of Commerce (DOC) and the International Trade Commission (ITC). The DOC is responsible for finding whether or not steel has been sold below production cost or subsidized, and the ITC for assessing whether material injury has occurred. These procedures are lengthy and very complex. Furthermore, duties are limited to the period after a preliminary finding of dumping or subsidies.

No suit involving major steel products has yet run its full course. At the present time, suits involving several Western European countries, Romania, and Brazil are being investigated by DOC and ITC.

Regulatory Policy. Because the steel industry is inherently dirty, noisy, and dangerous, there have been many efforts to improve conditions through regulation. These have imposed financial and operational burdens on the producers. In 1981, Congress passed the Steel Industry Compliance Extension Act, designed to relieve part of the burden if the producers used available funds for investment in modernization. Similarly, administrative changes have reduced some of the health and safety requirements.

Transition and Adjustment. Trade readjustment allowances are intended to ease the transition of certain laid-off workers to new employment. In 1980, 690,000 applications were filed that gave competition from imports as a primary cause of unemployment--of which about 130,000 were from former steel industry employees.

Until fiscal year 1982, workers displaced by imports could receive supplemental compensation through trade adjustment assistance at the same time that they received the normal unemployment insurance benefits. Together these could amount to about 70 percent of previous wages for up to 52 weeks of unemployment. This was changed in 1982 so that workers first receive their unemployment insurance for 26 weeks--equivalent roughly to 40 percent of previous wages--followed by an equal amount of supplemental trade readjustment allowance for another 26 weeks.

The readjustment program also includes services such as job placement, retraining, relocation allowances, counseling, and testing.

OUTLOOK FOR THE FUTURE: STEEL IN THE 1980s

The outlook given below for integrated steelmaking in the 1980s is not intended as a forecast. Rather, it is a projection of the outcomes associated with current federal policies and industry conditions. It is meant to serve as a point of departure for assessing whether alternative federal policies are worth considering and, if so, which are likely to be most helpful. The outlook is based on a set of projections of world steel demand, U.S. steel demand, and the market share that the domestic industry will achieve. The consequences in terms of employment, investment, and capital stock in the steel industry can then be estimated.

World Demand for Steel. World overcapacity in steelmaking is likely to persist, although current conditions will almost certainly improve. In 1981, the non-Communist sector operated at 68 percent of capacity. This projection suggests that the 1985-1990 operating rate will average between 70 and 77 percent, the same range that prevailed during the 1970s. As a result, competitive pressures in world steel markets will abate somewhat but nevertheless remain intense.

Many forecasters are optimistic that domestic steel demand will surge through 1984, because they expect a recovery in the economy. They differ as to whether demand after 1984 will continue to grow or will return to the stagnant conditions of the 1970s. This variance could result in the two scenarios for 1990 steel demand shown in Table 6. Under one assumption, steel consumption increases in 1983 and 1984 and then continues on its 1950-1981 trend line. Less optimistic assumptions about demand, and about penetrations of imports into new markets, could result in the lower scenario. 23/

Net imports are projected to increase over the decade because of continued overcapacity in the major steelmaking nations. Under the high projections, demand in home markets could reduce the need for many steel exporters to cut prices in order to sell in U.S. markets. Thus net U.S. imports are less in the high case than in the low case. Furthermore, in the low case, lack of investment would forfeit more new markets to importers than in the high case. Shipments of steel by domestic producers in 1990 remain within the range of recent experience under both cases, but the share of domestic production taken by the nonintegrated producers increases markedly. As a result, the market share of integrated producers falls from its 1981 level of 72 percent of the domestic market to between 61 and 66 percent by 1990.

TABLE 6. PROJECTIONS OF DOMESTIC CONSUMPTION AND SHIPMENTS OF STEEL (In millions of tons per year)

	1979	1980	1981	1982	1990 Low	1990 High
Domestic Demand	115	95	105	105	118	127
Net Imports into U.S.	15	11	17	14	26	22
Domestic Shipments	100	84	88	91	92	105
Shipments from Integrated Producers	89	72	76	78	72	84
Shipments from Nonintegrated Firms	11	12	12	13	20	21

SOURCE: Data in 1979 and 1980 are from AISI. Data for other years are CBO estimates.

Effects of Alternative 1990 Projections

Each of the 1990 projections carries with it different implications for investment and employment in the steel industry (see Table 7). Under the high scenario, the steel industry would probably invest roughly $30-37 billion (in 1980 dollars) in steel operations over the coming decade. This is more than the $19-26 billion that would be invested under the low scenario because higher margins would provide a greater incentive for investment.

The work force of the integrated producers would decline from its 1981 strength of 390,000 in both cases. In the high case, the labor force would decline to the range of 320,000-350,000 workers as productivity improvements offset the higher demand for steel. In the low case, the labor force would decline to the 275,000-305,000 range. By contrast, employment in the nonintegrated firms would rise from 30,000 in 1981 to around 50,000 in both 1990 projections.

A final concern--the ability of the integrated steelmakers to compete in new, fast-growing markets--is less subject to quantitative estimates. As the economy evolves, it demands increasingly sophisticated products from the steel industry. Among these are coated sheet steel, seemless alloy pipes, corrosion-resistant plates, and wide-diameter pipes. Domestic producers have been unable to provide a number of new products in recent years and do not seem to be investing to provide them in the future. In time, the nation may become more dependent on imports for high-quality products, so that foreign industries that embody high-quality steel in their products might gain an advantage over domestic industries.

TABLE 7. PROJECTIONS OF OUTPUT, INVESTMENT, AND EMPLOYMENT FOR INTEGRATED PRODUCERS

	1981	1990	
		Low Demand	High Demand
Output of Integrated Firms in 1990 (millions of tons)	76	72	84
Cumulative Capital Investment 1981-1990 (billions of 1980 dollars)	---	19-26	30-37
Investment in 1985 (billions of 1980 dollars)	---	2.2-2.7	3.2-4.0
Average Age of Facilities (years)	18.0	21.1	16.6
Employment (in thousands)	390	275-305	320-350

SOURCE: CBO estimates.

BRIEFING PAPER FOOTNOTES

1/ Joseph Wyman, Steel Mini Mills (Shearson Loeb Rhoades, November 20, 1980), p. 1.

2/ Standard and Poor's Industry Surveys, Steel-Coal, Basic Analysis (October 30, 1980), p. S 69.

3/ Standard and Poor's Industry Surveys, Steel-Coal Current Analysis (June 5, 1980), p. S-37.

4/ American Iron and Steel Institute, Steel at the Crossroads (January 1980), pp. 21 and 38.

5/ Peter Marcus, The Steel Strategist #5 (Paine, Webber, Mitchell, and Hutchins, Inc., February 1982), p. 13.

6/ The Official Journal of the European Communities reports on member government activities to promote steel, including use of subsidies. For example: "Medium-term Orientation for Steel Research" (May 2, 1981) and "State Aids" (November 9, 1981, and April 12, 1981).

7/ Dieter Spethman, Chairman of the Board of Thyssen (West Germany's largest steelmaker), in the Wall Street Journal (February 6, 1981).

8/ American Metal Market (Washington, D.C., March 18, 1981).

9/ Joseph Wyman, Steel Mini-Mills (Shearson Loeb Rhoades, Inc., Novem ber 20, 1980), p.1.

10/ Joel Hirschhorn, Continuing Success for United States Mini-Mills (draft), Office of Technology Assessment, no date, p. 5. Joseph Wyman, Shearson American Express, personal conversation on February 17, 1982, and Peter Marcus, World Steel Dynamics; Core Q (Paine, Webber, Mitchell, and Hutchins, Inc., September 1981), p. 1-6. Comparable estimates for Japan and West Germany are 9.6 and 11.0 man-hours per ton respectively.

11/ Joseph Wyman, Steel Mini-Mills.

12/ Beatrice Vaccara and Patrick MacAuley, "Evaluating Economic Performance of U.S. Manufacturing Industries," Industrial Economics Review (Department of Commerce, Summer 1980), p. 17.

13/ Peter Marcus, World Steel Dynamics: Core Q (Paine, Webber, Mitchell, and Hutchins, Inc., September 1981).

14/ Donald Barnett, "Labor Productivity Trends in the U.S. Steel Industry," Economic Papers (American Iron and Steel Institute, October 29, 1980).

15/ Office of Technology Assessment, Technology and Steel Industry Competitiviness (1980), p. 286. Walter Adams and Joel Dirlam, "Big Steel, Invention and Innovation," Quarterly Journal of Economics (May 1966), pp. 168-189.

16/ American Iron and Steel Institute, Annual Statistical Report (1980), p. 10. The petroleum and electrical utility industries have invested more in the aggregate, but not per unit of sales (Bureau of Economic Analysis, Department of Commerce).

17/ Robert Crandall, The U.S. Steel Industry in Recurrent Crisis (Brookings, 1981), p. 39.

Analysis of Economic Effects of Environmental Regulations on the Iron and Steel Industry (Temple Barker and Sloane, for EPA, July 1977).

Environmental Policy for the 1980s (Arthur D. Little, Inc., for American Iron and Steel Institute, 1981).

An Economic Analysis of Proposed Efficient Limitations (Temple Barker and Sloane, for EPA, December 1980).

Impact of New Source Review Policy on Capacity Expansion (Pedco Environmental, Inc., for EPA, October 1979).

18/ Steel at the Crossroads.

19/ Technology and Steel Industry Competitiveness, p. 59.

20/ Technology and Steel Industry Competitiveness.

21/ Statistics Canada, National Income and Expenditure Accounts, 1972-1977. U.S. Department of Treasury, Internal Revenue Service, Corporation Income Tax Returns, 1972-1977.

22/ Letter to Honorable Joseph Gaydos from Jane Gravelle, Congressional Research Service, Library of Congress (February 10, 1982), and discussion with author on March 3, 1982.

23/ Steel consumption as a function of real GNP has declined since 1970. Before that time, however, it had a steady relationship. If it continues its post-1970 behavior, future demand will fall at or below the 1965-1981 trend line.

APPENDIX: ADDITIONAL EXPLANATORY TABLES AND FIGURE.

TABLE A-1. FINANCIAL COMPARISONS OF NONINTEGRATED WITH INTEGRATED FIRMS SINCE 1974 (In percents)

	Pretax Profit Margin	Net Return on Assets	Net Return on Equity
NonIntegrated Firms	10.0	8.5	14.9
Large Integrated Firms	3.2	3.1	5.9

SOURCE: Joseph Wyman, Steel Mini-Mills (Shearson Loeb Rhoades, Inc., November 20, 1980), p.4.

The integrated firms included U.S. Steel, Inland, Bethlehem, National, Republic, and Armco. The comparison would have been worse for the integrated producers if the smaller integrated firms were included or if income from non-steel operations were excluded.

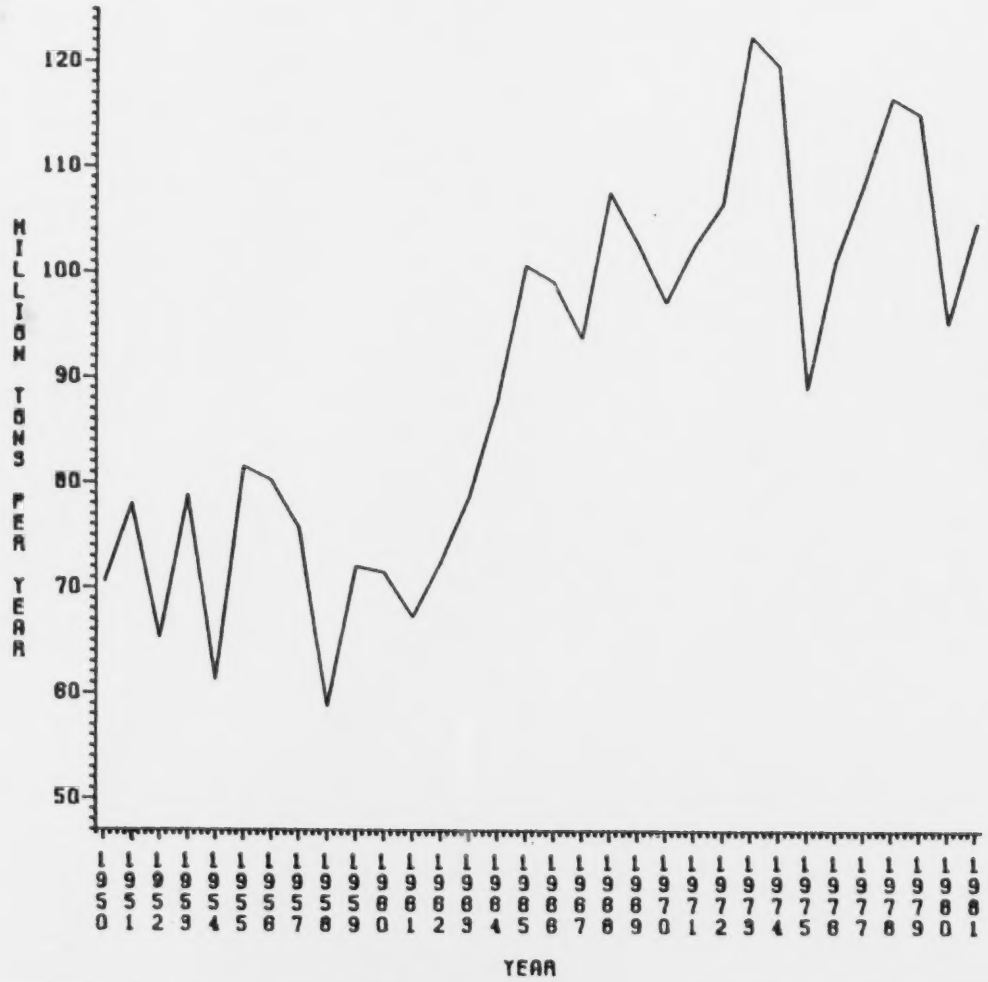
Nonintegrated firms were Athlone, Florida, Lukens, Northwestern, Nucor, Roblin, and Union.

TABLE A-2. PROJECTED CONSUMPTION OF STEEL PRODUCTS (Millions of tons per year)

	1979 Actual	1981 Estimated	1985 Mid-Range	1990 Low	1990 High
Automotive	20.8	15.4	18.3	17.8	19.4
Construction	17.6	14.4	18.1	18.6	21.4
Rail Transportation	6.5	6.1	6.5	6.5	6.8
Oil and Gas Industry	5.4	7.2	8.6	8.1	8.4
Machinery	11.0	9.9	11.7	12.6	13.6
Electrical Utilities	3.5	3.3	4.0	4.7	4.9
Domestic Appliances	5.3	4.6	5.9	6.1	6.7
Containers	6.9	6.4	7.1	7.1	7.3
Service Centers and Others	77.6	34.5	36.8	36.5	38.5
Inventory Changes	0.3	2.8	0.0	0.0	0.0
Total	114.9	104.6	113.0	118.0	127.0

SOURCES: Data Resources, Inc., for 1979; CBO for 1981, 1985, and 1990.

FIGURE A-1. UNITED STATES CONSUMPTION OF STEEL PRODUCTS, 1950-1981



SOURCE: American Iron and Steel Institute, Annual Statistical Reports.